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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,774	06/30/2003	Michael J. Zwilling	MSFT-1746/301620.1	1910

41505 7590 09/18/2007

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EXAMINER	
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ART UNIT	PAPER NUMBER
2162	

MAIL DATE	DELIVERY MODE
09/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/611,774	ZWILLING ET AL.	
	Examiner	Art Unit	
	Anh Ly	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *20-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 27-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is response to Applicants' AMENDMENT filed on 07/16/2007.

2. Claims 1-19 and 27-44 are pending in this Application.

Response to Arguments

3. The 101 rejections are withdrawn.

The applied reference Pub. No. US 2004/0054643 A1 of Vemuri et al. (hereinafter Vermuri) is still read on the newly added limitations "storing said difference storage". In the sections 0005 and 0023-0025 and fig. 2 of Vermuri teaches multiple versions of database stored in difference storage to be viewed by a user with the different transactions and the different points in time. The modifications such as undoing or redoing records or in the rolling forward process during recovery that has applied uncommitted changes to the database, then applying undo records to remove the uncommitted changes to the database, thereby, ensuring that only committed changes exits in the database after recovery.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-19 and 27-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pub. No.: US 2004/0054643 A1 of Vemuri et al. (hereinafter Vemuri) in view of Pub. No. US 2002/0091718 A1 of Bohannon et al. (hereinafter Bohannon).

With respect to claim 1, Vemuri teaches a method for providing a database view comprising transaction-consistent data reflecting the contents of a database at a specific point in time, said database comprising data elements and associated with a transaction log, said transaction log comprising active

transactions and inactive transactions; said database view comprising difference storage for storing prior versions of at least one of said data elements from said database (allowing different transactions to view database data from different point in time and creating multiple versions of database view data such as transactions corresponding to point in time, thus having difference storage based on the version's difference from the current version to prior version: sections 0003, 0005 and 0034), said method comprising:

identifying each transaction on said transaction log prior to said split point which performs modifications on said database (all transactions must be taken and committed at the same time; any changes made by that transaction to the database are rollback such that the database is returned to its pre-existing state from immediately prior to the aborted transaction: sections 0002, 0004-0005, 0020 and 0023-0025);

storing each of said modifications in said difference storage (using multiple versioning to allow different transactions to view database data from different points in time, that is, difference storage for storing prior version and current version: sections 0005, 0020 and 0023-0025);

identifying each active transaction on said transaction log prior to said split point (transaction log containing records that can be maintained to allow suitable recovery operations in the event of a system failure or aborted transaction and it includes active and non-active transaction records: sections 0003-0005, 0023-0025 and 0053-0055);

each data element is allocated in the difference storage (allocating space to store data: fig. 2 and section 0015 and 0019; also section 0027); and

undoing any corresponding modifications in said difference storage (undoing records being maintained to log undo information for the database: sections 0005, 0007 and 0021-0023, fig. 2).

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach determining a split point on said transaction log corresponding to said point in time and maintaining a side page table that comprises information regarding whether each data element is stored.

However, Bohannon teaches determining splitting log records spanning protection boundaries into multiple pieces ay any point in time a transaction's undo of logical actions in the multi-level recovery (abstract and sections 0076 and 0121) and page table of data pages to be maintained for database (sections 0030, 0074 and 0081).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any

point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 2, Vemuri teaches initializing said difference storage (fig. 2 and section 0027).

With respect to claims 3-5, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach a split point on and page table; and undoing any corresponding modifications in said difference storage comprises deleting said corresponding modifications.

However, Bohannon teaches determining splitting log records spanning protection boundaries into multiple pieces ay any point in time a transaction's undo of logical actions in the multi-level recovery (abstract and sections 0076 and 0121) and dirty page table (sections 0030, 0074 and 0081); and deleting transaction model in the undoing process (sections 0017 and 0142).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 6, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach reading corresponding unmodified data in said database; and writing said corresponding unmodified data in said difference storage.

However, Bohannon teaches logging information about reads of a database and wring log records (abstract, sections 0014, 0017-0018, 0035 and 0044).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claims 7-9, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach wherein each of said data elements comprises a page of data; wherein said difference storage comprises at least one sparse file; and wherein said step of storing each of said modifications in said difference storage comprises allocating a region of memory in one of said sparse files.

However, Bohannon teaches data pages storing in the dirty page table (sections 0030); database files in the processing log and lock data (sections

0027-0029); and allocating the storage for storing data files in the system (section 0027).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 10, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach for each page:
first stored data indicating whether said page has been stored in said difference storage; and second stored data indicating whether said region has been allocated in said difference storage.

However, Bohannon teaches data pages storing in the dirty page table (sections 0030); database files in the processing log and lock data (sections 0027-0029); regions of a database and by logging information about reads of the database and a checksum of the value of about reads (read logging (sections 0013, 0017 0018 and 0048-0050); and allocating the storage for storing data files in the system (section 0027).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 11, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach detecting that said page

table is invalid; for each region in said sparse files, determining whether said region has been allocated; for each region in said sparse files, setting said second stored data based on whether said region has been allocated.

However, Bohannon teaches data pages storing in the dirty page table (sections 0030); locking on pages in multi-level recovery process (sections 0071-0074) and allocating the storage for storing data files in the system (section 0027).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 12, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical

space to store the data. Vemuri does not clearly teach checking said first stored data, and if said first stored data indicates that said specific page has been stored in said difference storage, determining that data is stored in said specific page in said difference storage; checking said second stored data, and if said second stored data indicates that said region has not been allocated in said difference storage, determining that data is not stored in said specific page in said difference storage; and

if said first stored data does not indicate that said page has been stored in said difference storage and said second stored data does not indicate that said region has not been allocated in said difference storage, reading page data from a corresponding area of said difference storage for said specific page, and determining if said page data from said corresponding area is valid.

However, Bohannon teaches regions of a database and by logging information about reads of the database and a checksum of the value of about reads (read logging (sections 0013, 0017 0018 and 0048-0050).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and

by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claims 13-14, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach for each page:
first stored data indicating whether said page has been stored in said difference storage; checking said first stored data, and if said first stored data indicates that said specific page has been stored in said difference storage, determining that data is stored in said specific page in said difference storage; and if said first stored data does not indicate that said specific page has been stored in said difference storage, reading page data from a corresponding area of said difference storage for said specific page, and determining if said page data from said corresponding area is valid.

However, Bohannon teaches data pages storing in the dirty page table (sections 0030), locking on pages in multi-level recovery process (sections 0071-0074) regions of a database and by logging information about reads of the database and a checksum of the value of about reads (read logging (sections 0013, 0017 0018 and 0048-0050).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 15, Vemuri teaches accepting a request for a specific data element in said database view (abstract and sections 0031-0034);

determining if data is stored in a location corresponding to said specific data element in said difference storage (sections 0005 and 0034-0035);

responding to said request by reading said difference storage if data is stored in a location corresponding to said specific data element in said difference storage (abstract, sections 0002–0003, 0029, and 0034-0035); and

responding to said request by reading said database if data is stored in a location

corresponding to said specific data element in said difference storage (sections 0029, 0034-0035, and 0038).

With respect to claim 16, Vemuri teaches where said step of determining if data is stored in a location corresponding to said specific data element in said

difference storage comprises determining if said difference storage contains valid data in said location (sections 0029 and 0034-0035 and 0038).

With respect to claim 17, Vemuri teaches a method for providing a data view as discussed in claim 1.

Vemuri teaches allowing different transactions to view database data from different point in time and creating multiple versions of database such as split point on the transaction corresponding the point in time, thus having difference storage based on the version's difference from the current and prior version and undoing information for the database and transaction log, allocating the logical space to store the data. Vemuri does not clearly teach consulting a page table.

However, Bohannon teaches data pages storing in the dirty page table (sections 0030).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Vemuri with the teachings of Bohannon. One having ordinary skill in the art would have found it motivated to utilize the use of determining of splitting log records for at any point in time for recovery system in multi-level recovery process as disclosed (Bohannon's abstract and sections 0076 and 0212), into the system of Vemuri for the purpose of detecting and recovering from data corruption of a database and by logging information about reads of the database (Bohannon's sections 0003. 0011 and 0014).

With respect to claim 18, Vemuri teaches detecting a modification made to said database storing a first specific value to a location in said database in place

of a second specific data element; determining if a corresponding location in said database view contains valid data; if said corresponding location in said database view does not contain valid data, writing said second specific data element in said corresponding location (abstract, sections 0008-009, 0030, 0034-0035 and 0038).

Claim 19 is essentially the same as claim 1 except that it is directed to an operating system, a computer readable medium having stored thereon a plurality of computer-executable instructions rather than a method, and is rejected for the same reason as applied to the claim 1 hereinabove.

Claim 27 is essentially the same as claim 1 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 1 hereinabove.

Claim 28 is essentially the same as claim 2 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 2 hereinabove.

Claim 29 is essentially the same as claim 3 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 3 hereinabove.

Claim 30 is essentially the same as claim 4 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 4 hereinabove.

Claim 31 is essentially the same as claim 5 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 5 hereinabove.

Claim 32 is essentially the same as claim 6 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 6 hereinabove.

Claim 33 is essentially the same as claim 7 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 7 hereinabove.

Claim 34 is essentially the same as claim 8 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 8 hereinabove.

Claim 35 is essentially the same as claim 9 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 9 hereinabove.

Claim 36 is essentially the same as claim 10 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 10 hereinabove.

Claim 37 is essentially the same as claim 11 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 11 hereinabove.

Claim 38 is essentially the same as claim 12 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 12 hereinabove.

Claim 39 is essentially the same as claim 13 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 13 hereinabove.

Claim 40 is essentially the same as claim 14 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 14 hereinabove.

Claim 41 is essentially the same as claim 15 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 15 hereinabove.

Claim 42 is essentially the same as claim 16 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 16 hereinabove.

Claim 43 is essentially the same as claim 17 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 17 hereinabove.

Claim 44 is essentially the same as claim 18 except that it is directed to a computer readable medium rather than a method, and is rejected for the same reason as applied to the claim 18 hereinabove.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh Ly whose telephone number is (571) 272-4039 or via E-Mail: ANH.LY@USPTO.GOV (Written Authorization being given by Applicant (MPEP 502.03 [R-2])) or fax to (571) 273-4039 (unofficial fax number directly to examiner). The examiner can normally be reached on TUESDAY – THURSDAY from 8:30 AM – 3:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene, can be reached on (571) 272-4107.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). Any response to this action should be mailed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, or faxed to: **Central Fax Center: (571) 273-8300**

John E. Breene
JOHN BREENE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

ANH LY
SEP. 5th, 2007